NEW JERSEY'S LONG TERM WATER MONITORING and ASSESSMENT STRATEGY 2005-2014

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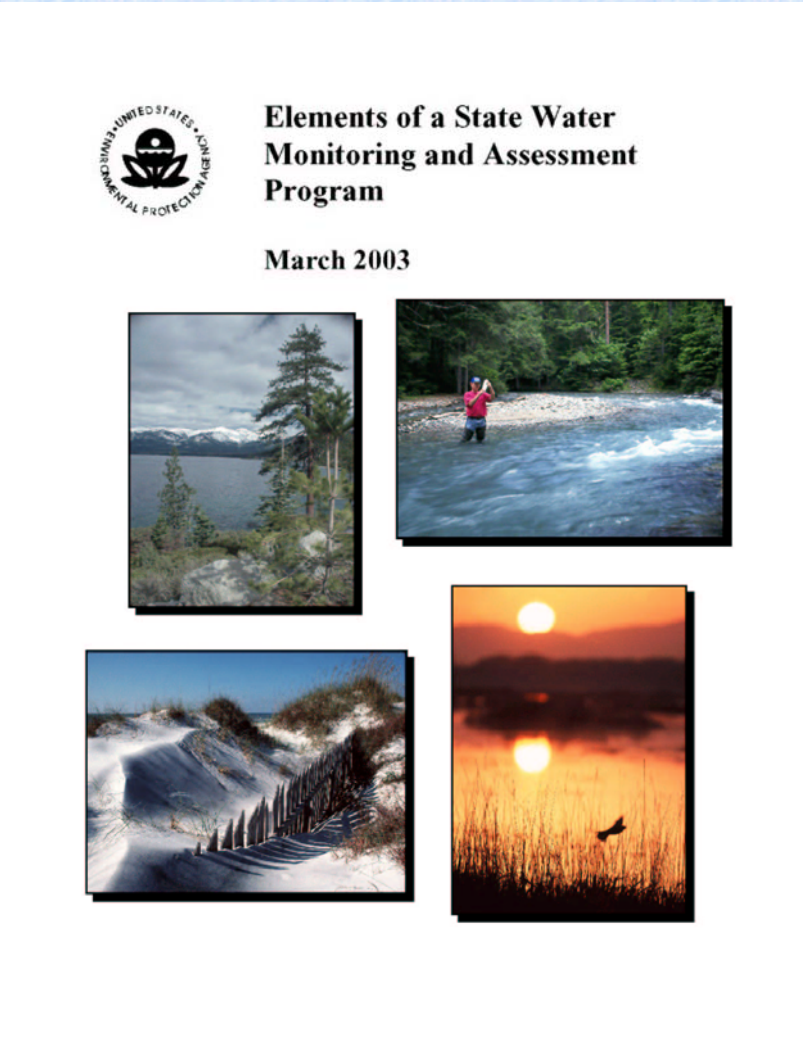
Monitoring Strategy

- Comprehensive plan required by EPA to follow "Elements of a State Water Quality Monitoring and Assessment Program"
- All States required to develop strategy
- 10 year timeframe
- Due to EPA Region 2 - Sept. 30, 2004
- Needed for continued receipt of federal 106 funds



NJ's Approach to Strategy Development:

- Scope - all ambient waters, organized by waterbody types
- ID of gaps, in addressing monitoring objectives & EPA questions & indicators
- Resource & technical support needs to fill gaps (5 yr & 10 yr)
- Application of emerging technologies
- ID of opportunities for monitoring efficiencies & partnerships
- General implementation plans to achieve adequate programs in 10 years

Must include monitoring & comprehensive assessment for all waters of the state:

- Streams
- Rivers
- Lakes
- Reservoirs
- Estuaries
- Coastal Areas
- Groundwater
- Wetlands

EPA Questions to be Considered in Strategy Development

- Overall quality of state's waters?
- Extent of water quality change over time?
- Problem areas & areas needing protection?
- Level of protection needed?
- Effectiveness of projects/programs?

Recommended Core & Supplemental Indicators

Recommended Core and Supplemental Indicators				
	Aquatic Life & Wildlife	**Recreation**	**Drinking Water**	**Fish/Shellfish Consumption**
Recommended Core Indicators	*Condition of biological communities (EPA recommends use of a least two assemblages) *Dissolved oxygen *Temperature *Conductivity *pH *Habitat assessment *Flow *Nutrients *Landscape conditions Additional indicators for lakes: *Eutrophic condition Additional indicators for wetlands: *Wetland hydrogeomorphic settings & functions	*Pathogen indicators (E. coli, enterococci) *Nuisance plant growth *Flow *Nutrients *Chlorophyll *Landscape conditions Additional indicators for lakes: *Secchi depth Additional indicators for wetlands: *Wetland hydrogeomorphic settings & functions	*Trace metals *Pathogens *Nitrates *Salinity *Sediments/TDS *Flow *Landscape conditions	*Pathogens *Mercury *Chlordane *DDT *PCBs *Landscape conditions
Supplemental Indicators	*Ambient toxicity *Sediment toxicity *Other chemicals of concern in water column or sediment *Health of organisms	*Other chemicals of concern in water column or sediment *Hazardous chemicals *Aesthetics	*VOCs (in reservoirs) *Hydrophyllic pesticides *Nutrients *Other chemicals of concern in water column or sediment *Algae	*Other chemicals of concern in water column or sediment

Strategy "Elements" for each water type include:

- **Monitoring Objectives**
- **Monitoring Design**
- **Core & Supplemental Water Quality Indicators**
- **QA/QC**
- **Data Management**
- **Data Analysis/Assessment**
- **Reporting**
- **Program Evaluation**
- **General Support/Infrastructure Planning (programmatic/resource needs)**

Adequacy of State Program

- **EPA evaluation criteria** for each of the 9 strategy elements

- **4 levels** of monitoring & assessment program development

Summary of NJ Long Term Monitoring and Assessment Strategy (draft)

Overall NJ Monitoring Approaches - DEP &/or Partners

- Long –Term Ambient Monitoring
- Targeted Water Quality Monitoring
- Volunteer Monitoring

NJ Monitoring Objectives

Monitoring is designed to achieve 1 or more of the following objectives:

- Establishing Water Quality Standards and classifying waters
- Determining Water Quality Status and Trends
- Identifying Impaired Waters and Waters Needing Protection
- Identifying Causes and Sources of Impairment
- Implementing Water Quality Management Programs
- Evaluating Program Effectiveness
- Responding to Environmental Spills

Monitoring Programs included in Strategy Document

- WM&S - multiple fresh and marine water programs
- NJGS - ambient ground water
- DSRT - toxics in fish & shellfish
- DWM - beach monitoring, TMDL monitoring, volunteer monitoring
- WSE - private well testing
- DWQ - ambient NJPDES monitoring
- DFW - fisheries monitoring
- SRP - ambient SRP monitoring
- Wetlands

Overall Water Quality Data Management Gaps: Technical Support and Resource Needs

- EPA needs to develop better integration of STORET data flow nationally (STORET CDX node/XML schema)
- OIRM assistance needed to improve data flow to EPA and from external data generators (e.g., volunteers, 319(h) contractors, data loggers)
- Need for support for lab information management system (LIMS)

Overall Water Quality Assessment Gaps:

- Enhance determination of spatial extent of impairments

- Assess biological data in Tiered Aquatic Life Use (TALU) format

- Develop assessment for sediment toxics data

Non-Tidal Rivers and Streams:

- DEP/USGS Ambient Stream Monitoring Program (115 sites)
  - **Gaps:**
    - **Periphytic chlorophyll 'a' monitoring** *(id impaired waters)*
    - **Number of background sites** (*wq status & trends*)
    - **Number of probabilistic sites** (*wq status & trends*)
    - **Continuous water temperature monitoring** (*wq status & trends*)
    - **Bacteriological monitoring beyond recreational primary contact season** (*wq status & trends*)

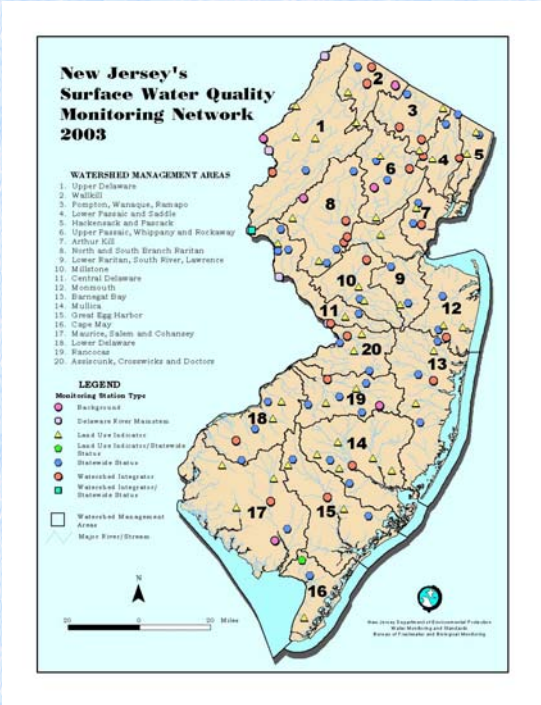
Non-Tidal Rivers and Streams:

- DEP Supplemental Ambient Surface Water Monitoring Network (90-100 sites)

  (flow - USGS)

  – **Gaps:**

    - **Heavy metals, toxic compounds, and bacteriological parameters** (*wq status & trends*)
    - **Periphytic chlorophyll 'a' measurements** *(id impaired waters)*
    - **Continuous water temperature monitoring** (*wq status & trends*)



Non-Tidal Rivers and Streams:

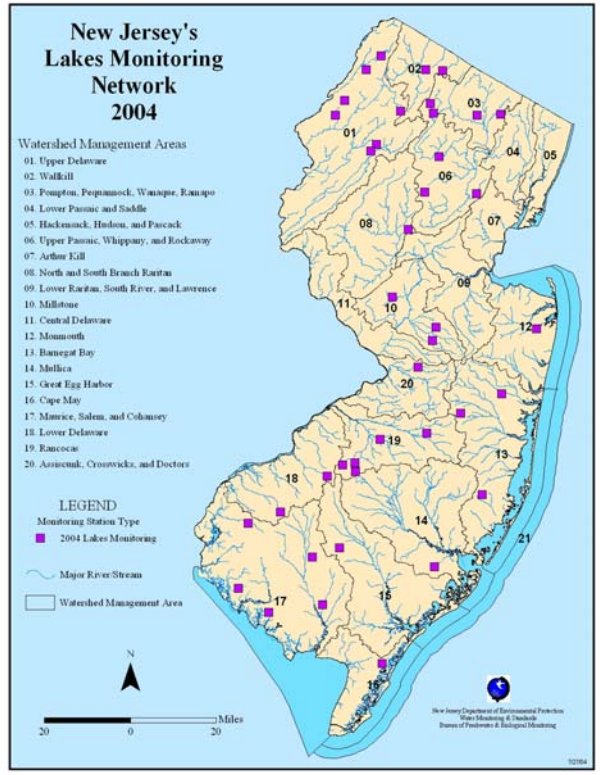
- Ambient Biological Monitoring Network (benthics)
  - **Gaps:**
    - **NJIS calibrated for genus/species level of taxonomic identification** *(id impaired waters)*
    - **Pinelands and headwater specific NJIS** *(id impaired waters)*
    - **Source identification/ track-down intensive surveys for severely impaired stream stations** *(id causes & sources)*
    - **Evaluate application of USEPA - GRTS probabilistic design to add a set of randomly selected AMNET stations to the network** (*wq status & trends*)
  - **EPA technical assistance in filling gaps**

Non-Tidal Rivers and Streams:

- NJ Fish Index of Biotic Integrity Network
  - **Gaps:**
    - **Network sampling of about 40 stations per year in the southern coastal plain (Non-Pinelands) waters** (*wq status & trends*)
    - **Network of headwater stream sampling consisting of about 100 stations; stations to be sampled once every five years** (*wq status & trends*)
  - **Need to maintain taxonomic expertise**

Lakes and Reservoirs:

- Ambient Lake Monitoring Network:
  - **Gaps:**
    - Short term trend assessments of changes occurring within five years (*wq status & trends*)
    - Biological component?

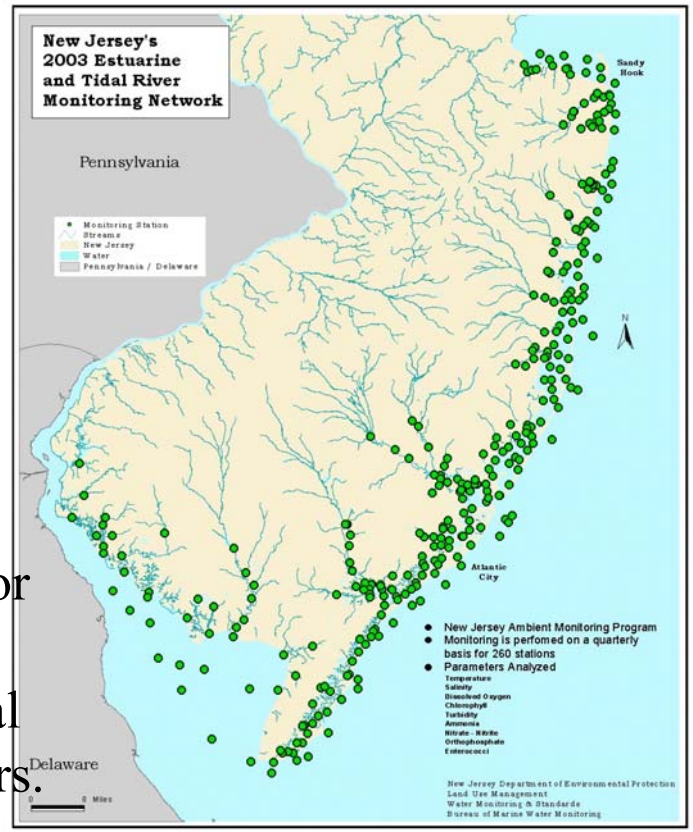


Tidal Rivers and Estuaries

NJ Coastal Water Monitoring Network

Gaps:

- No measures of benthic community - prime ecological indicator
- No measures of toxic pollutants in sediment or molluscan shellfish tissue
- Inadequate spatial and temporal resolution for DO
- Spatial gaps - NY/NJ Harbor & Delaware Tidal Tribs (DRBC)



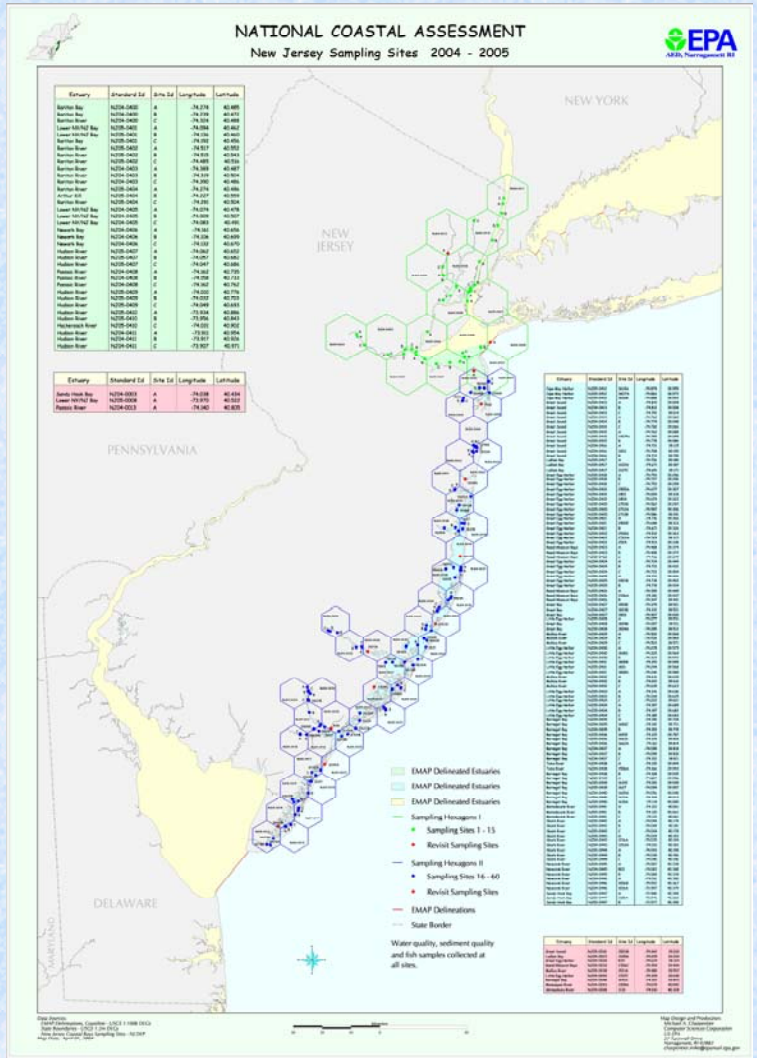
Strategy:

- Establish/monitor indicators of ecosystem health for coastal benthic community
- Combine this network with EPA's National Coastal Assessment research and extend into NJ ocean waters.
- Expand use of automated monitoring instruments.
- Pursue partnerships with other agencies/academia to coordinate monitoring efforts.

Tidal Rivers and Estuaries
National Coastal Assessment

Gaps:

- Water column measures are of limited value due to 1x/yr sampling (*determining water quality status and trends*)
- Does not include NJ's ocean waters (*determining water quality status and trends*)
- Lack of marine standards for nutrients or standardized classification for eutrophication (*establishing water quality standards*)
- Fish tissue methods vary from NJDEP methods (*water quality status and trends*)



Strategy:

- Combine with NJ Coastal Water Monitoring Network and extend into NJ ocean waters.
- Work with partners in developing standard protocols to assess eutrophic condition.

Tidal Rivers and Estuaries

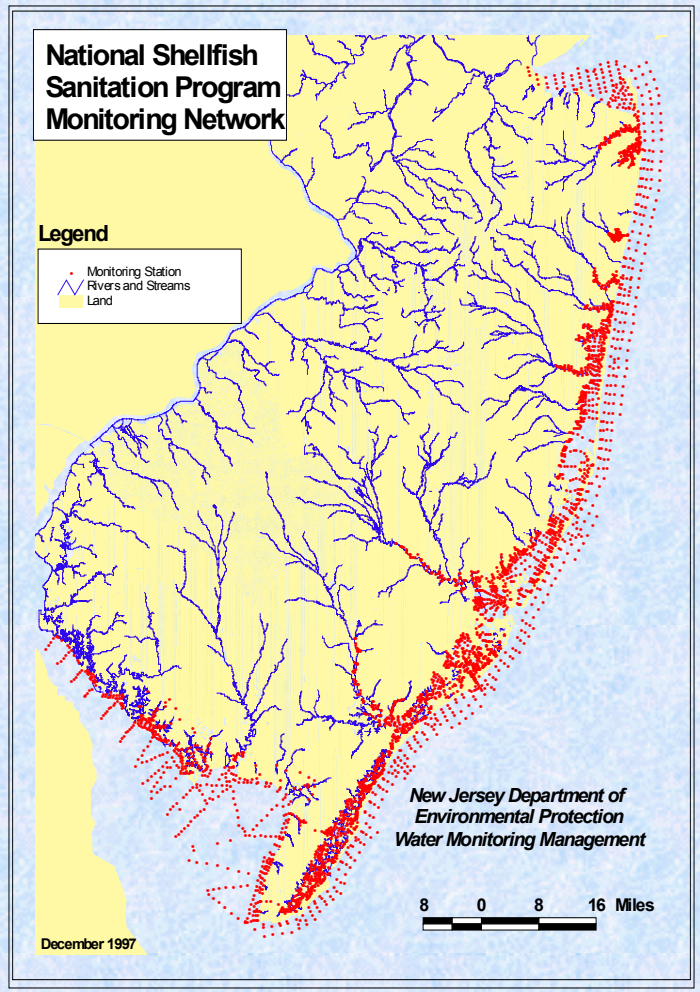
National Shellfish Sanitation Program

Gaps:

- Add'l need for pathogen source tracking for nonpoint sources (*id'ing sources of impairment*)
- No routine, statewide measures of toxic pollutants in molluscan shellfish (*water quality status and trends*)
- Inadequate spatial & temporal resolution for toxic phytoplankton blooms. Include brown tide monitoring? (*classifying waters*)

Strategy:

- Complete lab expansion to allow further use of coliphage and MAR
- Develop routine testing for toxic pollutants in shellfish tissue, possibly in conjunction with NCA
- Work through partnerships to establish routine remote sensing to enhance monitoring for toxic blooms.



Tidal Rivers and Estuaries

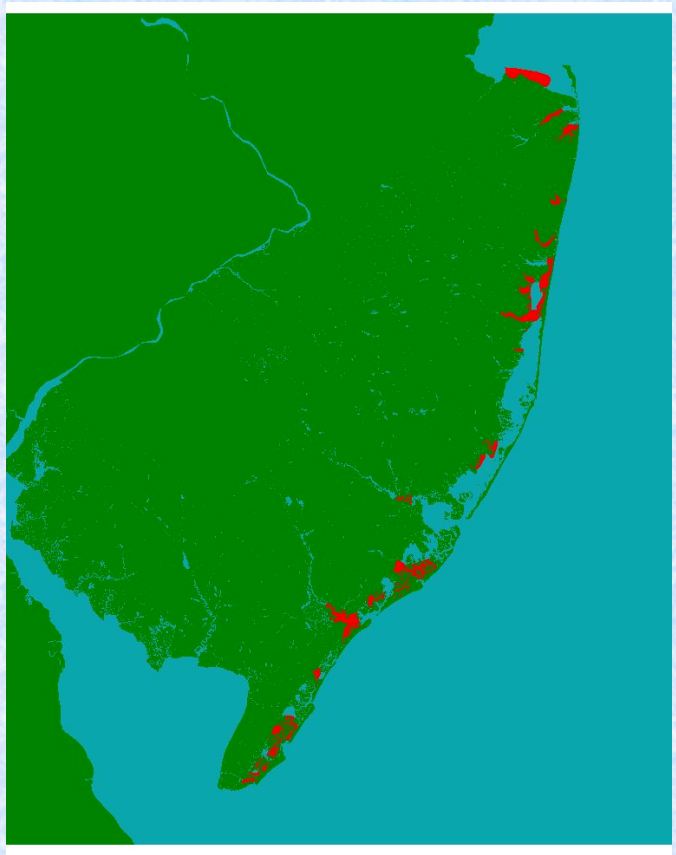
Nonpoint Source Monitoring - Source Tracking

Gaps:

- Capacity to perform nonpoint source tracking is much less than need. Approx. 30 tidal water locations requiring study with current capacity to handle 1-2 projects/year.
- Limited capacity to perform alternate indicator testing for source tracking.

Strategy:

- Complete expansion of laboratory for analysis of alternate indicators (coliphage and MAR)
- Complete research on automated sampling for microbial parameters
- Evaluate use of parameters that can be automated as lower cost surrogate for labor intensive parameters, reducing the cost of screening larger areas of water.



Rainfall impacted coastal waters

Beach Monitoring

Gaps:

• Need sampling/monitoring program for potential N. Jersey urban bathing beaches & Delaware Bay beaches (*wq status & trends*)

• Need add'l DEP lab source trackdown capabilities for diagnosis of coastal bathing area contamination of unknown origin (*source/cause impairment ID*)

LAKES BEACH MONITORING - seek web-based reporting and notification system similar to coastal beach monitoring?

Volunteer Monitoring

Gaps:

- Only 1 full time staff member currently coordinating volunteer efforts (*wq status & trends*)
- Greater quality control coordination needed
- No online data management system for volunteer-collected data
- Volunteer training needs (*implementing wq mgt programs*)
- Secure support for lakes trends assessment project?

TMDL Monitoring

Gaps:

• Project dependent - e.g., impairment confirmation/spatial extent refinement, additional source ID, lakes characterization monitoring, modeling support, restoration effectiveness monitoring

Ambient Ground Water Monitoring

Gaps:

- Need to define seasonal or climactic variability vs.true land use trends *(wq status & trends)*
- Need complete statewide status picture - available in next 6 months (*wq status & trends*)
- Need to integrate other ground water data (e.g., private wells, site remediation) into ground water assessment

Toxics in Fish and Shellfish

Gaps:

- No confirmed continuous funding source for routine fish monitoring
- Limited/no contaminant data for several popular recreational species - e.g., fluke, weakfish, sea bass (*wq status & trends*)
- Need to add emerging contaminants of concern (e.g., PBDEs - flame retardants)

Wetlands

Gaps:

- No currently existing national program that links to water quality program.
- No scientifically accepted wetlands monitoring protocols developed yet by EPA.
- National land use data sets provide lower resolution than NJ data.